

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

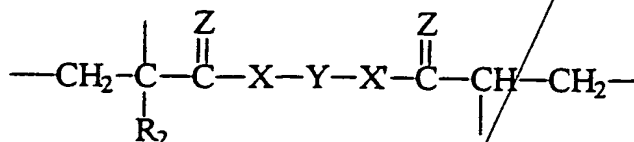
**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

RECEIVED 14 APR 1998

THE CLAIMS DEFINING THE INVENTION ARE AS FOLLOWS:

1. A crosslinked polymer gel comprising a crosslinking moiety of the formula:



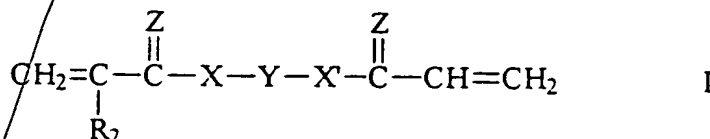
wherein X and X' are independently selected from the group consisting of -O-, -S- and -NR-, where R is H, alkyl or cycloalkyl,  
Y is an optionally substituted non-aromatic divalent linking group,  
Z is O or S; and

R<sub>2</sub> is a C<sub>1</sub>-C<sub>4</sub> alkyl group,  
provided that when said crosslinked polymer gel is a non-aqueous polymer gel and R<sub>2</sub> is CH<sub>3</sub> and Y is -CH<sub>2</sub>-CH<sub>2</sub>-, X, X' and Z are not all O.

2. A crosslinked polymer gel according to claim 1 wherein R<sub>2</sub> is CH<sub>3</sub>.

3. A crosslinked polymer gel according to claim 1 or claim 2, wherein the crosslinked polymer gel is a polymer or copolymer of acrylamide, an acrylamide derivative and/or an acrylamide substitute and optionally one or more other comonomers.

4. A crosslinked polymer gel according to any one of the preceding claims wherein the gel is an aqueous gel comprising the product formed by crosslinking polymerisation of one or more monomers selected from compounds of the formula H<sub>2</sub>C=CR<sub>5</sub>-CO-NR<sub>3</sub>R<sub>4</sub> where R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> are each independently selected from H or optionally substituted alkyl, and one or more crosslinking agents of the formula:



where X and X' are selected from the group consisting of -O-, -S- and -NR-, where R is H, alkyl or cycloalkyl,

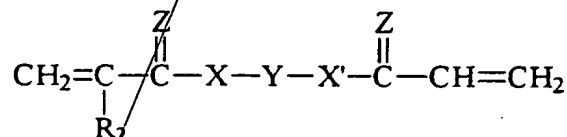
Y is an optionally substituted non aromatic divalent linking group,  
and Z is O or S.

5 A gel according to any one of the preceding claims wherein the  
divalent linking group is selected from the group alkylene, oxyalkylene,  
polyoxyalkylene, cycloalkylene, alkanedioyl, alkylenedisulphonyl,  
alkylenecarbonyl, thioalkylene, ureylene, oxalyl, aminoalkylene,  
alkylenedisulphonyl, heterocyclyl and groups of the formula  $-(R^1)_m-R^2-(R^3)_n-$ ,  
10 where  $R^1$  and  $R^3$  are selected from alkylene, cycloalkylene, heterocyclyl,  
oxyalkylene, polyoxyalkylene, alkylenecycloalkylene and  
alkyleneheterocyclyl;  $R^2$  is selected from a direct bond, -O-, -S-, -S-S-,  
alkylene, alkanedioyl, alkylenedioxy, alkylenedisulphonyl, -NR-, -NRC(O)O-,  
-NR-C(O)-NR-, -NRC(O)-, -N=N-, -NRC(O)C(O)-NR-, -C(O)-, -C(S)- and -  
15 RNNR-, where R is H, alkyl or cycloalkyl, m and n are 0 or 1 provided that  $m + n \neq 0$ .

6. A porous electrophoretic medium comprising a gel in accordance  
with any one of the preceding claims.

7. An electrophoretic medium according to claim 6 wherein the  
electrophoretic medium has a porosity gradient.

8. A method of preparing a crosslinked polymer gel, the method  
including the step of subjecting one or more monomers to crosslinking  
25 polymerisation with one or more crosslinking agents of formula :



wherein X and X' are independently selected from the group  
consisting of -O-, -S- and -NR-,

where R is H, alkyl or cycloalkyl,

$R_2$  is a  $C_1$ - $C_4$  alkyl group,

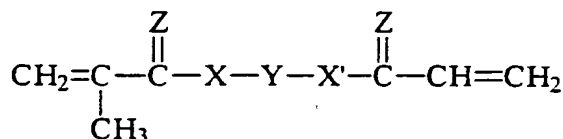
Y is an optionally substituted non aromatic divalent linking group,  
and Z is O or S.

9. A method according to claim 8 wherein the polymer gel is formed by crosslinking polymerisation of one or more crosslinking agents of formula I, optionally in the presence of one or more conventional crosslinking agents.

10. A method according to claims 8 or 9 wherein X and X' are the same and R<sub>2</sub> is CH<sub>3</sub>.

11. A method according to any one of claims 8 to 10 wherein the crosslinked polymer gel is an aqueous gel comprising the product formed by crosslinking polymerisation in the presence of an aqueous medium of one or more monomers selected from the formula H<sub>2</sub>C=CH-CO-NR<sub>3</sub>R<sub>4</sub> wherein R<sub>3</sub> and R<sub>4</sub> are each independently H or alkyl optionally mono-substituted with OH or C(O)CH<sub>2</sub>C(O)CH<sub>3</sub>, optionally one or more other comonomers and one or more cross-linking agents selected from compounds of formula I.

12. A compound of formula:



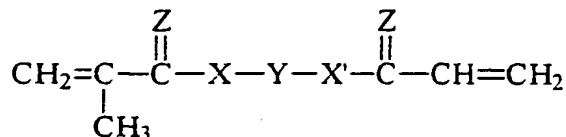
wherein X and X' are selected from -S- and -NR-, where R is H, alkyl or cycloalkyl, and

Y is an optionally substituted non aromatic divalent linking group, and

Z is O or S,

provided that when X and X' are both -NR-, Y is not -CH<sub>2</sub>- and does not include a quaternary ammonium group.

13. A compound of formula :



5

wherein one of X and X' is -O- and the other is selected from -S- and -NR-, where R is H, alkyl or cycloalkyl, and

Y is an optionally substituted non aromatic divalent linking group, and

10

Z is O or S;

provided that Y is not C<sub>1-5</sub> alkylene and does not include a quaternary ammonium group, and that when the other of X and X' is -NH-, Y is not methyleneoxy -2- hydroxypropylene.

15

14. A polymer gel according to any one of claims 1 to 5 wherein the polymer gel is formed by crosslinking polymerisation of one or more compounds according to claim 12 or claim 13.

20

15. A method of separating molecules comprising providing a crosslinked polymer gel according to any one of claims 1 to 14, placing a sample containing the molecules to be separated onto the gel, and subjecting the gel and sample to a separation technique.

B

25

16. A method according to claim 15 wherein the separation technique is electrophoresis.

B

30

17. A method according to claim 15 or 16 wherein the sample includes a biomolecule selected from proteins, enzymes, peptides, oligo- or polynucleotides and carbohydrates.

18. A crosslinked polymer formed from one or more monomers and one or more compounds in accordance with claim 12 or claim 13.